AWARD NUMBER: W81XWH-16-1-0558

TITLE: Examination of plasma PON1 paraoxonase activity and genotype in Gulf War veterans

PRINCIPAL INVESTIGATOR: Linda Chao

RECIPIENT: Northern California Institute for Research and Education
San Francisco, CA 94121

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Fort Detrick, Maryland 21702-5012

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6. AUTHOR(S): **Linda Chao**

E-Mail: linda.chao@ucsf.edu

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5e. TASK NUMBER

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San Francisco, CA 94121

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13. SUPPLEMENTARY NOTES

14. ABSTRACT

The goal of this project is to evaluate the extent to which $PON1_{192}$/Gulf War (GW)-related exposure interactions contribute to the risk for Gulf War Illness (GWI), as defined by the Centers for Disease Control and Prevention (CDC) and Kansas case definitions in a large sample of GW veterans. Specifically, we will: (1) determine the associations between GWI and GW-related exposures with the potential for "cholinergic" effects (e.g., personal pesticide use, exposure to OP nerve agents) in subgroups of veterans with different $PON1_{192}$ genotype. (2) determine the associations between GWI and each GW-related "cholinergic" exposure in subgroups of veterans with different PON1 activity levels and (3) calculate prevalence odds ratios for GWI/exposure associations separately for sugbroups of veterans with different $PON1_{192}$ genotypes and PON1 activity levels.

15. SUBJECT TERMS

Gulf War Illness (GWI), Paraoxonase-1 (PON1), organophosphates (OP), Gulf War-related exposures

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER	19a. NAME OF RESPONSIBLE PERSON
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TABLE OF CONTENTS

1. **INTRODUCTION:** Narrative that briefly (one paragraph) describes the subject, purpose and scope of the research.

The goal of this project is to evaluate the extent to which PON1$_{192}$/Gulf War (GW)-related exposure interactions contribute to the risk for Gulf War Illness (GWI), as defined by the Centers for Disease Control and Prevention (CDC) and Kansas case definitions in a large sample of GW veterans. Specifically, we will: (1) determine the associations between GWI and GW-related exposures with the potential for "cholinergic" effects (e.g., personal pesticide use, exposure to OP nerve agents) in subgroups of veterans with different PON1$_{192}$ genotype. (2) determine the associations between GWI and each GW-related "cholinergic" exposure in subgroups of veterans with different PON1 activity levels and (3) calculate prevalence odds ratios for GWI/exposure associations separately for sugbroups of veterans with different PON1$_{192}$ genotypes and PON1 activity levels.

2. **KEYWORDS:** Provide a brief list of keywords (limit to 20 words).

Gulf War Illness (GWI), Paraoxonase-1 (PON1), organophosphates (OP), Gulf War-related exposures

3. **ACCOMPLISHMENTS:** The PI is reminded that the recipient organization is required to obtain prior written approval from the awarding agency Grants Officer whenever there are significant changes in the project or its direction.

What were the major goals of the project?
List the major goals of the project as stated in the approved SOW. If the application listed milestones/target dates for important activities or phases of the project, identify these dates and show actual completion dates or the percentage of completion.

1. Obtain information about GW-related exposures from participants of the completed DoD-funded GW study for whom we have PON1$_{192}$ genotype and PON1 activity data (by 10th month).
2. Obtain PON1$_{192}$ genotype and PON1 activity levels for veterans participating in the on-going VA Merit GW study at the SF VAMC (by month 17).
3. Obtain PON1$_{192}$ genotype and PON1 activity levels on biosamples from the Gulf War Illness Consortium (GWIC) (by month 27).
4. Obtain PON1$_{192}$ status and PON1 activity levels for veterans participating in the re-evaluation study of the Ft. Devens cohort (by month 15).
5. Analyze PON1 and self-reported GW-exposure data (by month 33).

What was accomplished under these goals?
For this reporting period describe: 1) major activities; 2) specific objectives; 3) significant results or key outcomes, including major findings, developments, or conclusions (both positive and negative); and/or 4) other achievements. Include a discussion of stated goals not met. Description shall include pertinent data and graphs in sufficient detail to explain any significant results achieved. A succinct description of the methodology used shall be provided. As the project progresses to completion, the emphasis in reporting in this section should shift from reporting activities to reporting accomplishments.

Major activities and achievements:

A. Submitted local IRB approvals for all study sites to HSPS, initially to Priyadarshini Kapoor (on 5/6/16) and then again to Patricia Shank (11/23/2016). Received HRPO approval for the SF VAMC, University of Washington, VA Boston Health Care System (BVARI), Boston University, and Baylor College of Medicine sites.

B. Contacted, consented, and received completed Kansas Military History and Health Questionnaires from 85 participants of previous DoD-funded Gulf War Study for whom we have PON1 information.

C. Sent blood samples for 103 participants of the PI's on-going VA Merit Gulf War study to Dr. Furlong's laboratory at the University of Washington for PON1 processing and analysis.

What opportunities for training and professional development has the project provided?
If the project was not intended to provide training and professional development opportunities or there is nothing significant to report during this reporting period, state "Nothing to Report."

Describe opportunities for training and professional development provided to anyone who worked on the project or anyone who was involved in the activities supported by the project. "Training" activities are those in which individuals with advanced professional skills and experience assist others in attaining greater proficiency. Training activities may include, for example, courses or one-on-one work with a mentor. "Professional development" activities result in increased knowledge or skill in one's area of expertise and may include workshops, conferences, seminars, study groups, and individual study. Include participation in conferences, workshops, and seminars not listed under major activities.

Nothing to report.

How were the results disseminated to communities of interest?
If there is nothing significant to report during this reporting period, state "Nothing to Report."

Describe how the results were disseminated to communities of interest. Include any outreach activities that were undertaken to reach members of communities who are not usually aware of these project activities, for the purpose of enhancing public understanding and increasing interest in learning and careers in science, technology, and the humanities.

Nothing to report.

What do you plan to do during the next reporting period to accomplish the goals?
If this is the final report, state "Nothing to Report."

Describe briefly what you plan to do during the next reporting period to accomplish the goals and objectives.

The Boston VA/BVARI site has 20 samples that they are getting ready to ship to Dr. Furlong's laboratory for PON1 analysis.

The Boston VA/BVARI site will continue to recruit GW veterans from the Fort. Devens cohort for blood samples and to complete the Kansas Military History and Health Questionnaire.

The GWIC has about 100 samples ready to send to Dr. Furlong's laboratory once we receive HRPO clearance for Dr. Klimas' site, which houses all the GWIC samples.

Dr. Sullivan has a no cost extension for the GWIC to acquire additional samples over the next 15 months.

4. **IMPACT:** Describe distinctive contributions, major accomplishments, innovations, successes, or any change in practice or behavior that has come about as a result of the project relative to:

What was the impact on the development of the principal discipline(s) of the project?
If there is nothing significant to report during this reporting period, state "Nothing to Report."

Describe how findings, results, techniques that were developed or extended, or other products from the project made an impact or are likely to make an impact on the base of knowledge, theory, and research in the principal disciplinary field(s) of the project. Summarize using language that an intelligent lay audience can understand (Scientific American style).

Nothing to report.

What was the impact on other disciplines?
If there is nothing significant to report during this reporting period, state "Nothing to Report."

Describe how the findings, results, or techniques that were developed or improved, or other products from the project made an impact or are likely to make an impact on other disciplines.

Nothing to report.

What was the impact on technology transfer?
If there is nothing significant to report during this reporting period, state "Nothing to Report."

Describe ways in which the project made an impact, or is likely to make an impact, on commercial technology or public use, including:

- *transfer of results to entities in government or industry;*
- *instances where the research has led to the initiation of a start-up company; or*
- *adoption of new practices.*

Nothing to report.

What was the impact on society beyond science and technology?
If there is nothing significant to report during this reporting period, state "Nothing to Report."

Describe how results from the project made an impact, or are likely to make an impact, beyond the bounds of science, engineering, and the academic world on areas such as:

- *improving public knowledge, attitudes, skills, and abilities;*
- *changing behavior, practices, decision making, policies (including regulatory policies), or social actions; or*
- *improving social, economic, civic, or environmental conditions.*

Nothing to report.

5. **CHANGES/PROBLEMS:** The Project Director/Principal Investigator (PD/PI) is reminded that the recipient organization is required to obtain prior written approval from the awarding agency Grants Officer whenever there are significant changes in the project or its direction. If not previously reported in writing, provide the following additional information or state, "Nothing to Report," if applicable:

Changes in approach and reasons for change
Describe any changes in approach during the reporting period and reasons for these changes. Remember that significant changes in objectives and scope require prior approval of the agency.

Nothing to report.

Actual or anticipated problems or delays and actions or plans to resolve them
Describe problems or delays encountered during the reporting period and actions or plans to resolve them.

157 of the 247 GW veterans for whom we had PON1 data did not respond to our letter inviting them to participate in the current research project. These veterans either did not receive the letter because we did not have their current mailing addresses or they were not interested in participating in the current study. Five of the 247 GW veterans for whom we had PON1 data have since died.

Changes that had a significant impact on expenditures
Describe changes during the reporting period that may have had a significant impact on expenditures, for example, delays in hiring staff or favorable developments that enable meeting objectives at less cost than anticipated.

Nothing to report.

Significant changes in use or care of human subjects, vertebrate animals, biohazards, and/or select agents
Describe significant deviations, unexpected outcomes, or changes in approved protocols for the use or care of human subjects, vertebrate animals, biohazards, and/or select agents during the reporting period. If required, were these changes approved by the applicable institution committee (or equivalent) and reported to the agency? Also specify the applicable Institutional Review Board/Institutional Animal Care and Use Committee approval dates.

Significant changes in use or care of human subjects

There are no significant deviations or changes in approved protocols for the use of human subjects. The current IRB approval dates are:

SF VAMC site: approved: 02/23/2017; expires 2/22/2018
Boston VA/BVARI site: approved 11/14/16, protocol expires 11/13/17
Boston VA site: approved 6/23/16, expires: 6/7/18
Baylor College of Medicine site: approved: 9/13/16, protocol expires: 07/26/18

The University of Washington IRB determined that the UW site is not "engaged" in human subject research. Therefore, the UW IRB decided that IRB approval for the activities conducted by the UW research team is not required.

Significant changes in use or care of vertebrate animals.

N/A

Significant changes in use of biohazards and/or select agents

N/A

6. **PRODUCTS:** List any products resulting from the project during the reporting period. If there is nothing to report under a particular item, state "Nothing to Report."

- **Publications, conference papers, and presentations**
  Report only the major publication(s) resulting from the work under this award.

  Journal publications. *List peer-reviewed articles or papers appearing in scientific, technical, or professional journals. Identify for each publication: Author(s); title; journal; volume: year; page numbers; status of publication (published; accepted,*

awaiting publication; submitted, under review; other); acknowledgement of federal support (yes/no).

Nothing to report.

Books or other non-periodical, one-time publications. *Report any book, monograph, dissertation, abstract, or the like published as or in a separate publication, rather than a periodical or series. Include any significant publication in the proceedings of a one-time conference or in the report of a one-time study, commission, or the like. Identify for each one-time publication: Author(s); title; editor; title of collection, if applicable; bibliographic information; year; type of publication (e.g., book, thesis or dissertation); status of publication (published; accepted, awaiting publication; submitted, under review; other); acknowledgement of federal support (yes/no).*

Nothing to report.

Other publications, conference papers, and presentations. *Identify any other publications, conference papers and/or presentations not reported above. Specify the status of the publication as noted above. List presentations made during the last year (international, national, local societies, military meetings, etc.). Use an asterisk (*) if presentation produced a manuscript.*

Nothing to report.

- **Website(s) or other Internet site(s)**
  List the URL for any Internet site(s) that disseminates the results of the research activities. A short description of each site should be provided. It is not necessary to include the publications already specified above in this section.

Nothing to report.

- **Technologies or techniques**
  Identify technologies or techniques that resulted from the research activities. In addition to a description of the technologies or techniques, describe how they will be shared.

Nothing to report.

- **Inventions, patent applications, and/or licenses**

Identify inventions, patent applications with date, and/or licenses that have resulted from the research. State whether an application is provisional or non-provisional and indicate the application number. Submission of this information as part of an interim research performance progress report is not a substitute for any other invention reporting required under the terms and conditions of an award.

Nothing to report.

- **Other Products**

  Identify any other reportable outcomes that were developed under this project. Reportable outcomes are defined as a research result that is or relates to a product, scientific advance, or research tool that makes a meaningful contribution toward the understanding, prevention, diagnosis, prognosis, treatment, and/or rehabilitation of a disease, injury or condition, or to improve the quality of life. Examples include:

  - *data or databases;*
  - *biospecimen collections;*
  - *audio or video products;*
  - *software;*
  - *models;*
  - *educational aids or curricula;*
  - *instruments or equipment;*
  - *research material (e.g., Germplasm; cell lines, DNA probes, animal models);*
  - *clinical interventions;*
  - *new business creation; and*
  - *other.*

N/A

7. PARTICIPANTS & OTHER COLLABORATING ORGANIZATIONS

What individuals have worked on the project?

Provide the following information for: (1) PDs/PIs; and (2) each person who has worked at least one person month per year on the project during the reporting period, regardless of the source of compensation (a person month equals approximately 160 hours of effort). If information is unchanged from a previous submission, provide the name only and indicate "no change."

Name:	Linda Chao
Project Role:	PI
Researcher Identifier:	0000-0002-8593-2434 (eRA Commons: lindachao)
Nearest person month worked:	0.6 calendar months
Contribution to Project:	Dr. Chao has work closely with Drs. Furlong, Sullivan, Steele, Krengel, and Klimas to coordinate all aspects of project, from study procedures, data collection, to data quality control.
Name:	Alexandra Liu
Project Role:	Research Assistant in Dr. Chao's laboratory
Researcher Identifier:	N/A
Nearest person month worked:	1.2 calendar months
Contribution to Project:	Ms. Liu has been re-contacting the Gulf War veterans who participated in the completed, DoD-funded Gulf War project for which their PON1 status had been determined, recruiting, and consenting them to complete the Kansas Gulf War Military History and Health Questionnaire for the current study.
Name:	Nancy Klimas
Project Role:	Co-Investigator
Researcher Identifier:	0000-0003-1459-3268
Nearest person month worked:	0.24 calendar months
Contribution to Project:	Dr. Klimas' laboratory houses all the GWIC samples. She will oversee the preparation and sending of the GWIC biorepository to Dr. Furlong's laboratory for PON1 analyses.

Has there been a change in the active other support of the PD/PI(s) or senior/key personnel since the last reporting period?
If there is nothing significant to report during this reporting period, state "Nothing to Report."

If the active support has changed for the PD/PI(s) or senior/key personnel, then describe what the change has been. Changes may occur, for example, if a previously active grant has closed and/or if a previously pending grant is now active. Annotate this information so it is clear what has changed from the previous submission. Submission of other support information is not necessary for pending changes or for changes in the level of effort for active support reported previously. The awarding agency may require prior written approval if a change in active other support significantly impacts the effort on the project that is the subject of the project report.

Name: Linda Chao

Changes:
1. Effort on 5I01CX000798-04 has been reduced from 9.75 to 5.16 calendar months
2. UCSF Resource Allocation Program Grant "Establishing Feasibility of a Longitudinal Multimodal Imaging Study in Dementia Patients Participating in an Integrative Exercise Program" ended on 6/30/17.
3. Pending VA grant "Pilot test of Telephone-Delivered Cognitive Behavioral Therapy for Insomnia for Veterans with Gulf War Illness" was awarded (5I21CX001428-02; performance period: 7/1/16 – 6/30/19). Dr. Chao is PI and her effort on this project is 5.4 calendar months.
4. DOD/CDMRP grant "Using Multimodal Imaging to Examine the Neural Mechanisms of an Integrative Exercise Program for Individuals with Dementia" (AZ160019) was awarded (performance period: 8/1/17-7/31/20). Dr. Chao is PI and effort on this project is 0.6 calendar months.
5. DOD/CDMRP grant "Gene-Environmental Interactions in Multiple Cohorts of 1990-91 Gulf War Veterans" (GW160053) was awarded (performance period: 9/1/17-8/31/20). Dr. Chao is Co-Investigator and her effort on this project is 0.24 calendar months.

Name: Kimberly Sullivan

Changes:
1. DOD/CDMRP grant GW120037 has ended, but is currently on-cost extension. Dr. Sullivan's effort on this project has been reduced from 3.6 to 2.64 calendar months.
2. DOD/CDMRP grant GW110054 ended, but is currently on no-cost extension.
3. DOD/CDMRP grant GW130100 ended on 8/31/17.
4. DOD grant "Microtubule abnormalities underlying Gulf War Illness in neurons from human induced pluripotent cells" ended on 6/30/17.
5. Pending DVA, CSR&D grant "Novel Interventions for Gulf War Veterans' Illnesses" has been awarded, however, Dr. Sullivan is no longer receiving funding from this grant. She now serves as an unpaid collaborator.
6. Dr. Sullivan's effort on DOD/CDMRP grant "Novel Autoantibody Serum and Cerebrospinal Fluid Biomarkers in Veterans with Gulf War Illness" has been reduced from 3.6 to 2.4 calendar months.
7. The end date for DOD grant "D-cycloserine –A Novel Treatment for Gulf War Illness" is now 6/30/18 and Dr. Sullivan's effort has been reduced from 0.9 to 0.84 calendar months.

8. DOD/CDMRP grant GW150116 has been awarded (performance period: 9/30/16 to 9/29/19). Dr. Sullivan is devoting 0.96 calendar months to this project.
9. DOD/CDMRP grant GW150050P1 has been awarded (performance period: 9/30/16 to 9/29/19). Dr. Sullivan is devoting 0.96 calendar months to this project.
10. "A Randomized, Double-blind Placebo-controlled Phase III Trial of Coenzyme Q10 in Gulf War Illness" grant from the Department of Veterans Affairs has been awarded (performance period 4/1/17-1/31/20). Dr. Sullivan is devoting 2.4 calendar months to this project.
11. DOD/CDMRP grant GW160032 was awarded (performance period: 9/1/17-8/31/20). Dr. Sullivan is devoting 0.96 calendar months to this project.
12. DOD.CDMRP grant GW160151 was awarded (performance period: 9/1/17-8/31/19). Dr. Sullivan is devoting 0.48 calendar months to this project.
13. DOD/CDMRP grant GW160053 was awarded (performance period: 9/1/17 – 8/31/20). Dr. Sullivan is devoting 0.96 calendar months to this project.
14. DOD/CDMRP grant GW160096 was awarded (performance period: 10/1/17-9/30/20). Dr. Sullivan is devoting 0.96 calendar months to this project.
15. DOD W81XWH-12-1-0585 ended on 8/31/16, but is current on no-cost extension. Dr. Sullivan is devoting 1.2 calendar months to this project.

Name: Clement Furlong
Changes:
1. CDC/NIOSH grant "Measurement of Farmworker Exposure to OP Pesticides through Protein Adducts" ended on 9/29/16.
2. UW Center for Process Analysis and Control grant "Advanced Surface Plasmon Resonance Sensors" ended on 9/30/16.
3. NIH/NIEHS grant "Hazardous Substances Basic Research Program: Effects-related biomarkers for neurotoxic exposures" ended 8/31/17.
4. Pending grant "Role of BPHL/homocysteine thiolactonase in hyperhomocysternia and disease" was awarded (performance period: 8/1/16-7/31/17).
5. Pending grant "Characterization of PON1 as an early biomarker of CVD susceptibility" was awarded (performance period: 7/1/16-6/30/19).
6. UW Center for Process Analysis and Control grant "Continuous manufacturing system for pharmaceutically useful proteins, and monitoring with a NeSSI system and SPR biosensors" was awarded (performance period: 10/1/16-9/30/17).

Name: Lea S/teele
Changes:
1. DOD/CDMRP grant GW120037 has ended, but is currently on-cost extension. The new end date is 9/28/18 and Dr. Steele is devoting 3 calendar months to the project.
2. DOD/CDMRP grant GW120045 ended 9/14/17.
3. DOD/CDMRP grant GW130063 has a new end date, 9/30/19, and Dr. Steele is contributing 0.6 calendar months to this project.
4. DOD/CDMRP award GW100067 ended on 8/31/16.
5. DOD/CDMRP award GW100068 has a new end date of 8/31/19. Dr. Steele is contributing 1.2 calendar months to this project.
6. DOD/CDMRP grant GW150116 was awarded (performance period 9/30/16-9/29/19). Dr. Steele is contributing 0.6 calendar months to this project.

7. DOD/CDMRP grant GW160013 was awarded (performance period: 9/1/17-8/31/20). Dr. Steele will contribute 0.3 calendar months in FY 2-3.
8. DOD/CDMRP grant GW160106 was awarded (performance period: 9/30/17-9/29/20). Dr. Steele is contributing 0.6 calendar months to this project.
10. DOD/CDMRP grant GW160077 was awarded (performance period 9/30/17-9/29/20). Dr. Steele is contributing 0.3 calendar months to this project.

Name: Maxine Krengel
Changes:
1. DOD/CDMRP grant GW100046 ended on 10/31/16.
2. DOD grant # W81XWH-12-1-0585 ended on 9/29/17.
3. VA HSR&D grant "Identifying mTBI Subtypes and their implications for recovery and reintegration" has been extended. The new end date is 12/30/17. Dr. Krengel's contribution remains 1.2 calendar months.
4. DOD/CDMRP grant GW120037 has ended, but is currently on-cost extension.
5. VA CSR&D grant CX000524-01A1 was granted a cost-extension. The new end date is 3/31/18. Dr. Krengel's effort has been reduced from 2.4 to 1.2 calendar months.
6. DOD grant # W81XWH-15-1-0640 was awarded (performance period 9/30/15-9/29/18). Dr. Krengel is contributing 0.6 calendar months to the project.
7. VA CSR&D grant "Novel interventions for Gulf War Veteran's Illnesses" was awarded (performance period 7/1/16-6/30/21). Dr. Krengel is contributing 0.6 calendar month to the project.
8. DOD/CDMRP grant GW150050P1 was awarded (performance period: 10/1/17 – 8/31/19). Dr. Krengel is contributing 3 calendar months to the project.
9. VA grant "A Randomized Double-blind Placebo-controlled Phase III Trial of Coenzyme Q10 in Gulf War Illness" was awarded (performance period: 4/1/17-1/31/20). Dr. Krengel is contributing 2.4 calendar months to the project.

Name: Nancy Klimas
Change:
1. Dr. Klimas' contribution to NIH grant R01NS090200 has been reduced from 1.5 to 0.972 calendar months. The grant also has a new end date of 7/31/18.
2. Dr. Klimas' contribution to VA Merit grant SPLD-995-13F has been reduced from 1.8 to 0.6 calendar months.
3. DOD grant W81XWH13-2-0071 has ended, but is currently on-cost extension. Dr. Klimas' effort on this project has been reduced from 0.9 to 0.72 calendar months.
4. CDC grant "Clinical Assessment of Patients with CFS and Biorepository Development ended on 9/28/17.
5. DOD grant W81XWH-13-2-0085 has been extended. The new performance period is 9/30/13-9/29/18. Dr. Klimas' effort on this project has been reduced from 0.9 to 0.792 calendar months.
6. Dr. Klimas' effort on VA Merit grant "A Translational Medicine Approach to Gulf War Illness: From Cells to Therapy" has been reduced from 1.1 to 0.432 calendar months.
7. Dr. Klimas' effort on DOD grant W81XWH-15-1-0582 has been reduced from 0.4 to 0.36 calendar months.

8. DOD grant W81XWH-15-1-0537 has been extended. The new end date is 6/30/18 and Dr. Klimas' effort on this project has been reduced from 2.4 to 0.6 calendar months.
9. Dr. Klimas' role on DOD grant W81XWH-15-1-0163 has been reduced from 2.4 to 0.216 calendar months.
10. NIH grant 1R21AI12487 was awarded (performance period: 4/6/16-3/31/18). Dr. Klimas is contributing 0.072 calendar months to this project.
11. NIH grant R15 NS087604-01A1 was awarded (performance period 4/15/15-3/31/18). Dr. Klimas is contributing 0.072 calendar months to this project.
12. DOD grant W81XWH-161-1-0632 was awarded (performance period 9/30/16-9/29/19). Dr. Klimas is contributing 0.144 calendar months to this project.
13. DOD grant W81XWH-161-1-0552 was awarded (performance period 9/30/16-9/29/19). Dr. Klimas is contributing 0.144 calendar months to this project.
14. DOD grant W81XWH-16-1-0678 was awarded (performance period 9/30/16-9/29/19). Dr. Klimas is contributing 0.36 calendar months to this project.
15. VA Merit grant SPLD-04-15F was awarded (performance period 7/1/16-6/30/19). Dr. Klimas is contributing 0.72 calendar months to this project.
16. DOD/CDMRP grant GW160116 was awarded (performance period: 9/1/17-8/30/19). Dr. Klimas is contributing 0.216 calendar months to this project.
17. DOD/CDMPR grant GW160123 was awarded (performance period: 9/30/17-9/29/20). Dr. Klimas is contributing 0.36 calendar months to this project.

What other organizations were involved as partners?
If there is nothing significant to report during this reporting period, state "Nothing to Report."

Describe partner organizations – academic institutions, other nonprofits, industrial or commercial firms, state or local governments, schools or school systems, or other organizations (foreign or domestic) – that were involved with the project. Partner organizations may have provided financial or in-kind support, supplied facilities or equipment, collaborated in the research, exchanged personnel, or otherwise contributed.
Provide the following information for each partnership:
Organization Name:
Location of Organization: (if foreign location list country)
Partner's contribution to the project (identify one or more)

- *Financial support;*
- *In-kind support (e.g., partner makes software, computers, equipment, etc., available to project staff);*
- *Facilities (e.g., project staff use the partner's facilities for project activities);*
- *Collaboration (e.g., partner's staff work with project staff on the project);*

Name:	Clement Furlong
Organization Name:	University of Washington
Project Role:	Site PI
Researcher Identifier:	0000-0002-6489-7211 (eRA Commons: furlong)
Nearest person month worked:	0.6 calendar months
Contribution to Project:	Dr. Furlong is directing Ms. Richter in determination of PON1 status of the Gulf War veterans in the study.
Name:	Rebecca Richter
Organization Name:	University of Washintgon
Project Role:	Research Scientist in Dr. Furlong's laboratory
Researcher Identifier:	N/A
Nearest person month worked:	3.0 calendar months
Contribution to Project:	Ms. Richter has been working with Dr. Furlong to determine the PON1 status of the 103 Gulf War veterans' plasma samples from Dr. Chao's VA Merit award using the three-substrate assay/analysis protocol.
Name:	Kimberly Sullivan
Organization Name:	Boston University
Project Role:	Site PI
Researcher Identifier:	0000-0001-7940-6123
Nearest person month worked:	0.36 calendar months
Contribution to Project:	Dr. Sullivan is providing serum samples and Gulf War-related exposure data from the Department of Defense-funded (GW120037) multi-site Gulf War Illness consortium (GWIC) for study analysis. Once we receive HRPO clearance for Dr. Klimas' site, which houses all the GWIC samples, 100 GWIC samples will be sent to Dr. Furlong's laboratory.
Name:	Maxine Krengel
Organization Name:	Boston VA/Boston VA Research Institute (BVARI)
Project Role:	Site PI
Research Identifier:	0000-0001-7632-590X
Nearest person month worked:	0.60 calendar months
Contribution to Project:	Dr. Krengel is providing serum samples and Gulf War-related exposure data from her call-back survey study of the Fort Devens cohort. She will send 20 samples this month.
Name:	Lea Steele
Organization Name:	Balyor College of Medicine
Project Role:	Site PI
Research Identifier:	0003-4940-069X
Nearest person month worked:	0.6 calendar months
Contribution to Project:	Dr. Steele has worked with study collaborators on study planning and design.

8. SPECIAL REPORTING REQUIREMENTS: N/A

9. APPENDICES: Attach all appendices that contain information that supplements, clarifies or supports the text. Examples include original copies of journal articles, reprints of manuscripts and abstracts, a curriculum vitae, patent applications, study questionnaires, and surveys, etc.

N/A